29 FACILITIES AND ASSOCIATED SYSTEMS

This section discusses three major FAA concerns: (1) maintaining existing facilities, (2) replacing and expanding facilities, and (3) new facilities. Also discussed are human factors, risk-mitigation activities, physical security, and costs related to these concerns.

"Facilities" are defined as driveways, roads, grounds, and staffed or unstaffed buildings that are owned, leased, or maintained by the FAA. The term "building" applies to an individual structure and to any enclosed, attached supporting utility systems such as electrical power conditioning and distribution systems and heating, ventilation, and air conditioning (HVAC) equipment.

Facilities must meet requirements mandated by public law and Executive order for facility accessibility and structural and nonstructural seismic reinforcement of occupied federal buildings. Newly constructed facilities and retrofits for existing structures are designed to meet these requirements. Security risk-reduction measures such as fences, guardhouses, and access control systems—when determined to be necessary—are considered as part of a separate security risk-management system for the building or facility. Additional requirements exist to upgrade the facilities to accommodate security risk-management measures. Physical security costs are covered in Section 31, Mission Support.

The FAA maintains and improves buildings and structures that house NAS equipment and personnel (see Table 29-1). Several key facilities are near the end of their forecasted structural economic life.

Refurbishing or replacing these facilities will sustain their existing capability. In cases where facilities are leased, landlords are responsible for some maintenance. However, the FAA maintains these facilities to the extent agreed upon in the leasing agreement.

Table 29-1. Average Age of Key NAS Facilities

Facility Type	Number	Average Age (Years)
ATCT (Towers)	419	26
ARTCC (Centers)	20	40
TRACONs (Terminals)	171	22

Based on their average age, most air traffic control (ATC) facilities will need to be substantially refurbished or replaced between 2001 and 2015. The NAS architecture accounts for this needed effort, and specific details will be developed over the next few years.

The requirements for facility upgrades caused by adding or modifying installed equipment will be defined by the acquisition program providing the new equipment or modification. These requirements include space, quality and quantity of power, and HVAC. A concurrent determination by the responsible line of business (LOB) and the acquisition program will be made concerning the impact of equipment addition or modification on the need for additional security risk-reduction measures at the facility.

29.1 Air Route Traffic Control Centers

The air route traffic control centers (ARTCCs) and the national network control centers (NNCCs) will get structural repairs, external repairs, and internal remodeling. Old water and sewer lines will be replaced. New or refurbished backup power equipment, power conditioning equipment, and batteries will be provided.

In addition, the FAA will make child care facilities available to employees at each of its ARTCCs. These facilities will be completed within the next few years.

29.2 Terminal Facilities

NAS terminal facilities include airport traffic control tower (ATCT) and terminal radar approach control (TRACON) installations. TRACONs include a category of large TRACONs, which consolidate the terminal control responsibilities formerly managed by two or more TRACON facilities. A current example is the proposed Potomac TRACON that will control airspace presently under the jurisdiction of Dulles, Baltimore-Washington, and Ronald Reagan Washington National Airports, along with Andrews Air Force Base— all located in the Washington, D.C., metropolitan area.

PART III

Table 29-2. New TRACON Consolidations

Large TRACON	Consolidated TRACONs
Denver	Colorado Springs Pueblo Grand Junction
Atlanta	Atlanta Macon Columbus
Potomac	Dulles National Baltimore Andrews AFB
Northern California	Oakland Sacramento Stockton Monterey Selected Oakland Center Sectors
Central Florida	Jacksonville Orlando Tampa Patrick AFB

Source: NAS Transition and Integration, Terminal Facilities Division
(ANS-200)

29.2.1 TRACON and Airport Traffic Control Tower Facilities

Standby power and HVAC equipment at all facilities will be replaced over the next 20 years. Site security systems will be upgraded, with special attention given to the physical security at supporting facilities located on remote islands.

Annually, selected ATCT installations and TRACONs are modernized to accommodate additional traffic at airports and to extend their service life. TRACONs/towers are replaced or consolidated with other operations if they have reached the end of their economic life.

Airport cable loop systems are being upgraded or replaced with fiber optic technology. This upgrade provides the facilities with state-of-the-art communications pathways and allows for redundant nodes and pathways for communications, should a cable cut occur.

Airport traffic control towers and TRACON facilities are evaluated for modernization or replacement in accordance with FAA Order 6480.17. Fifty-three facilities are qualified and validated for establishment or replacement, with 18 of these presently under construction and installation of electronics.

Over the next several years, the FAA will build six to eight replacement facilities per year. The Honolulu TRACON will be expanded to house the combined center radar approach control (CERAP) in Hawaii. A TRACON/tower facility will be completed for Austin-Bergstrom International Airport. Several other airports will qualify for federally funded contract ATC facilities.

29.2.2 Large TRACONS

The New York TRACON facility will be expanded or replaced. The five facilities shown in Table 29-2 will consolidate several existing ATC facilities into a single ATC facility. These facility consolidations will support a more efficient design of the airspace in selected U.S. geographic areas. Facility consolidation will improve ATC operations and reduce the total cost of operating multiple smaller facilities.

Airspace actions are subject to environmental assessments and procedures if the area of the proposed facility is less than 3,000 sq. ft. Compliance with the National Environmental Policy Act of 1969 (NEPA) is mandatory for each organization establishing an airspace configuration.

29.3 Flight Service Station Facilities

The installation of the Operational and Supportability Implementation System (OASIS) requires additional space, electrical power capacity, and HVAC at existing automated flight service station (AFSS) locations. In addition, power conditioning and battery backup capabilities will be added at those AFSSs that experience frequent interruptions due to power fluctuations.

29.4 General NAS Facilities

General NAS facilities—numbering well into the thousands—house and support communications, surveillance, and navigational aids. All of these facilities are aging and must be periodically refurbished. This ongoing need is handled by prioritizing the facilities on the basis of their condition, criticality of their function to the NAS mission, and other criteria. The top-priority facilities then receive roofs, paint, siding, or whatever is needed to complete refurbishment and bring the facility up to current standards. Additional requirements exist to upgrade the facilities to accommodate security risk-management measures.

29.5 NAS Support Facilities

Facilities and equipment at the William J. Hughes Technical Center (WJHTC) in Atlantic City, N.J., are failing and need refurbishment. Specifically, chiller and boiler units and electrical substations are scheduled to be refurbished or replaced. Drainage system and fire protection system improvements will be accomplished. Refurbishment of FAA-owned airport runways, taxiways, shoulders, and airport lighting systems is planned.

Plans include new facilities at the Mike Monroney Aeronautical Center (MMAC) to provide areas for training, logistics, engineering, and aeromedical research. New training complexes will provide classrooms, training laboratories, and work areas. New engineering support areas will accommodate support personnel, systems, equipment, and functions for defining and resolving NAS problems, sustaining engineering functions, and related activities. The logistics support area provides space for repair, test, quality control, engineering, and supply support functions. The Civil Aeromedical Institute, general Aeronautical Center operations (e.g., storage, staging, shipping, maintenance, flight line support), and other tenant needs will be accommodated.

29.6 FAA Residences (Employee Housing)

The FAA operates and maintains quarters for employees and their families in remote areas where suitable housing is unavailable. This ongoing effort provides, maintains, and refurbishes residences and other temporary quarters in Alaska, the Caribbean, the Grand Canyon, Nantucket, and the Pacific Territories. The FAA also leases housing units when it is economical.

29.7 Facility Power System Maintenance

Current power systems provide for various levels of reliability for the NAS system, service, or facility to be supported. The level of air traffic activity determines the design of the power system installed. The most critical facilities—ARTCCs and some large TRACONs—have multiple redundant systems, which include at least two separately derived utility power sources, multiple uninterruptable power systems, and excess engine/generator capacity to allow for engine/generator failure.

Newer technology systems have less tolerance for power interruptions than the older equipment.

Most new systems, especially commercial-off-the-shelf-based workstations, require several minutes to reboot and reload software when power is interrupted. For some critical air traffic systems and services, this type of interruption is unacceptable. To prevent these occurrences, uninterruptable power systems are provided. The most expensive components are the batteries, which have a service life of 5 to 10 years.

Approximately 3,500 engine/generator units are available for standby power. Most of these engines are over 20 years old and are being replaced on a scheduled basis. The current goal is to maintain an engine/generator inventory that is no more than 15 years old.

Facility power systems, including power control cables and lightning protection, are also considered part of the infrastructure and are currently being upgraded.

29.8 Environmental Concerns

The FAA is subject to a number of environmental statutes and regulations when either establishing or disposing of facilities. These concerns are addressed in Section 30, Environment and Energy.

29.9 Facility Security

The FAA uses thousands of navigation and ATC facilities of all types, sizes, and functions to carry out its responsibilities for efficiently managing and controlling the NAS. Damage to or destruction of any FAA facility has a measurable affect on the NAS—depending on the criticality of the facility and its mission in overall NAS operations. Federal facilities may be vulnerable to potential internal sabotage and external attacks, which could disrupt NAS operations, degrade flying safety, compromise national security, and damage the U.S. economy.

All elements of the FAA's critical infrastructure need physical facility security protection. Critical assets at FAA facilities need to be identified, risks assessed, and the threats and vulnerabilities to those assets reduced or eliminated. Physical security must be addressed in an orderly, logical process that results in cost-effective risk reduction and minimizes operational inconveniences while preserving operational integrity.

PART III

As a federal agency, the FAA and its facilities are required to comply with those minimum facility physical security standards identified in the June 1985 Department of Justice (DOJ) report, *Vulnerability Assessment of Federal Facilities*. The FAA is currently conducting facility physical security surveys and assessments to identify critical security risks. These surveys will lead to risk-reduction measures that will ensure each facility meets baseline security standards identified in the DOJ report and FAA Order 1600.6c (FAA Physical Security Management Program).

Plans for new facilities or major modification to existing facilities will be coordinated with the Office of Civil Aviation Security Operations (ACO-400) to ensure appropriate security measures have been included in the design plans. Facilities that are to be occupied by FAA elements must have provisions that enable facility management to:

- Control access into the facility at all times

  – Reduce the number of entrances to the minimum consistent with the operational needs of the facility

  – Locate parking 100 feet from the facility and in one area on the facility site

- Control the removal of and/or the unauthorized access to FAA property, equipment, personnel, and official records

- Obtain protective services and/or public safety response when disorders or other emergency situations arise.

Utility systems vital to the continued operation of the NAS facility will be protected against tampering, vandalism, and sabotage. Where possible, areas containing critical utility systems will not be located adjacent to high-use areas, such as loading docks, visitor entrances, parking areas, etc. Where key utilities must be located outside the main structure, whenever possible they will not be located within 100 feet of the perimeter fence, boundary, or parking areas. Such utilities would include:

- Telephone and electrical closets

- Power supply equipment to include emergency power equipment

- Power conditioning equipment and rooms

- Environmental control systems

- Air conditioning rooms and equipment.

The design of a NAS facility should emphasize the internal and external configuration of the facility and the proper placement of assets or resources having security considerations. The correct location of a facility function can often serve as an effective safeguard and deterrent against unauthorized entry, theft, or sabotage.

Electronic card access systems, intrusion detection alarms, and closed-circuit television are increasingly used in FAA facilities. Close coordination with ACO-400 and the responsible civil aviation security regional office will ensure human resources, equipment hardware, and software are fully integrated for the protection of personnel, facilities, and assets. FAA regional civil aviation security offices will conduct security surveys of new or renovated existing facilities to determine and establish baseline security risk-reduction measures that will ensure that each facility meets the minimum federal physical security standards identified in FAA Order 1600.6c and the DOJ report.

29.10 Human Factors

Providing the proper facilities and environment for the people and equipment that support the NAS requires application of human factors engineering during the acquisition of FAA facilities (whether new, modified, or consolidated). This approach is similar to the way human performance considerations are incorporated into other FAA acquisitions for systems and services.

Human-workspace interfaces, human operational requirements, and associated safety considerations within the facilities are the basis for including human factors engineering during the planning (buy, lease, or build), alternative analysis, design, testing, and acceptance of facilities. Human factors engineering focuses on identifying and resolving human engineering and ergonomic issues related to operational requirements, workspace and equipment layout, team communication, organizational design, and personnel health, comfort, and occupational safety.

This approach reduces long-term costs (through efficient design and use of personnel resources, skills, training, and procedures for the facility),
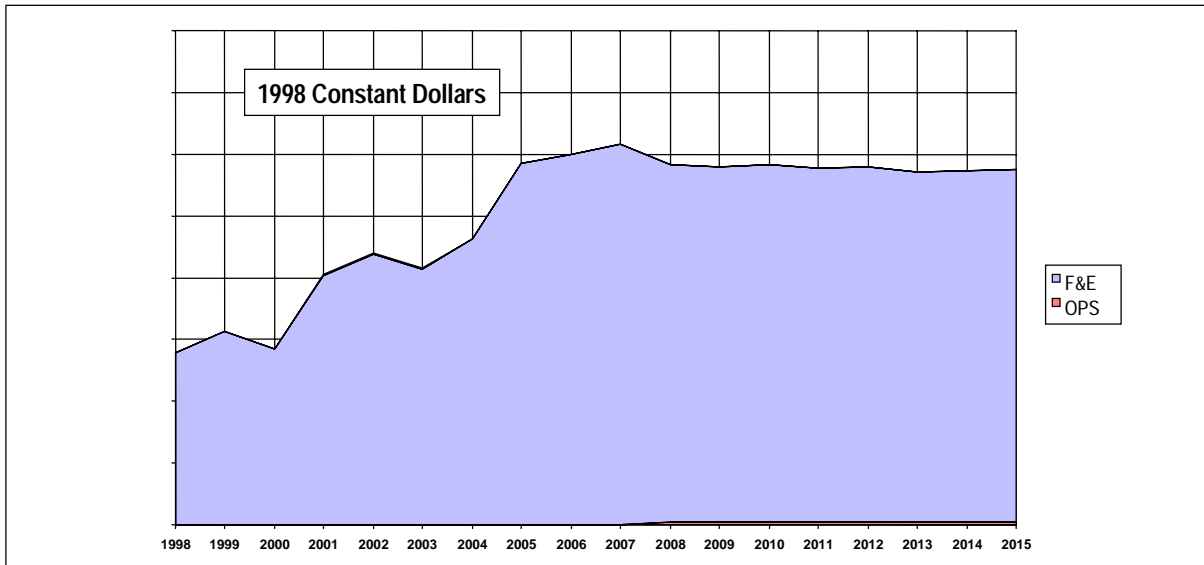
1998 Constant Dollars

1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015

F&E
OPS

Figure 29-1. Estimated Facilities Costs

minimizes the need for facilities modification (through improved compatibility and suitability with the operational and maintenance concepts), and enhances the performance of NAS operations and maintenance.

29.11 Costs

The FAA estimates for facilities and equipment (F&E) and operations (OPS) life-cycle costs for facilities and associated equipment architecture from 1998 through 2015 are presented in Figure 29-1. OPS costs are for computer aided engineering graphics (CAEG) system maintenance.

29.12 Summary

The FAA must continue to maintain its facilities and associated systems. The key facilities in the NAS are aging and supportability of the facilities is a critical need that the FAA can no longer defer.

PART III